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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/681,481

10/08/2003

Paul A. Farrar

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07/24/2007

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EXAMINER

KORNAKOV, MIKHAIL

ART UNIT

PAPER NUMBER

1746

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/681,481	<b>Applicant(s)</b> FARRAR, PAUL A.	
	<b>Examiner</b> Michael Kornakov	<b>Art Unit</b> 1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 April 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29, 41, 42, 44-46 is/are pending in the application.  
4a) Of the above claim(s) 3,4,6,8,13,15,19,21,26-29 and 45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5, 7, 9-12, 14, 16-18, 20, 22-25, 41, 42, 44, 46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>04/26/07</u> . | 6) <input type="checkbox"/> Other: _____  |

Art Unit: 1746

### **DETAILED ACTION**

1. Applicant's amendment dated 04/26/2007 is acknowledged. Claims 1, 5, 6, 11-13, 16, 18, 19, 22, 26, 28, 29, 41, 44, 45 are amended. Claim 43 is cancelled and the limitations of claim 43 are introduced into claims 1, 11, 16, 22, 26, 41. Claims 1-29, 41, 42, 44-46 are pending. Claims 3, 4, 6, 8, 13, 15, 19, 21, 26-29, 45 are withdrawn. Claims 1, 2, 5, 7, 9-12, 14, 16-18, 20, 22-25, 41, 42, 44, 46 are examined on the merits.

### ***Specification***

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. The recited in **originally presented** claim 43 "immersing the semiconductor assembly in a **halogenated hydrocarbon** fluid" is not disclosed by the instant specification and therefore appropriate correction is required. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o).

### ***Claim Objections***

3. Claim 13 is objected to because of the following informalities: the identifier to claim 13 recites "(Currently Amended)". However, this claim was not elected for prosecution (see Office Action dated 01/22/2007, page 2). Therefore, the identifier to claim 13 should state (Withdrawn – Currently amended). Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 5, 11, 12, 16, 18, 22, 41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1, 11, 16, 22, 41 recite "a carrier fluid **including** a halogenated hydrocarbon fluid", which reads on a carrier fluid having some other ingredients. However, the instant disclosure teaches that "chlorocarbons or chlorofluorocarbons may be used as a **carrier fluid**" (page 10, lines 10-12), thus indicating a carrier fluid having chlorocarbons or chlorofluorocarbons only. Dependent claims 5, 12, 18 recite "a carrier fluid including de-ionized water". The combination of chlorocarbons or chlorofluorocarbons (as recited in parent claims 1, 11, 16) and de-ionized water, as a carrier fluid, is not taught or suggested by the instant disclosure.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 1746

7. Claims 1, 2, 5, 7, 9-12, 14, 16-18, 20, 22-25, 41, 42, 44, 46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. The recited in claims 1, 11, 16, 22, 41 "a carrier fluid including a halogenated hydrocarbon fluid in an amount sufficient to immerse the semiconductor surface" constitutes an indefinite subject matter, because it is not clear whether the amount of carrier fluid or the amount of halogenated hydrocarbon is indicated. It is also not clear what Applicant regards as semiconductor surface and whether the semiconductor surface is related to the entire substrate/wafer or just to the side/surface to be developed. Therefore, the step of placing the semiconductor surface in contact with a carrier fluid ...to immerse the semiconductor surface is not clearly defined. Clarifications are required. Claims 2, 5, 7, 9, 10, 12, 14, 17, 18, 20, 23-25, 42, 44, 46 are rejected because of their dependency and failure to remove the ambiguity of parent claim.

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 1, 2, 5, 7, 9-12, 14, 16-18, 20, 22-25, 41, 42, 44, 46 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson et al (U.S. 5,013,366) in view of Tipton et al (U.S. 6,800,142).

Art Unit: 1746

Jackson teaches a method of cleaning a contaminated substrate (col.7, lines 3-5). Jackson describes a second specific embodiment wherein cleaning procedure comprises suspending (immersing) substrate in a liquid suspension medium (reads on "a carrier fluid", as claimed), such as deionized water; forming a supercritical fluid in contact with the substrate and shifting the phase of the fluid (reads on "changing a thermodynamic condition of the supercritical fluid), thus forming gas bubbles in the liquid suspension medium (Fig. 7; col. 2, lines 36-41; col.4, lines 10-13; paragraph, bridging col.10 and col.11). The supercritical fluid can be formed from carbon dioxide (col. 11, line 8). With regard to claims 9 and 10, see col. 8, lines 10-20, wherein shifting the phase of the fluid is achieved by changing both a pressure and temperature of the supercritical fluid. Jackson also teaches the use of mechanical energy, such as sonic energy to enhance cleaning action (col.11, lines 36-40).

With regard to claim 25, Jackson does not specifically indicate the use of megasonic wave energy. However, Jackson teaches that high energy sonic bursts agitate the substrate to promote the breaking of bonds between the contaminants and the substrate being cleaned (paragraph, bridging col. 11 and 12). Since the use of megasonic waves is well known in the art (see, for example U.S. 5,456,759 to Stanford) and since Jackson provides motivation to apply high energy sonic bursts, one skilled in the art would have found obvious to utilize megasonic waves while cleaning the substrate in the teaching of Jackson with the reasonable expectation of success.

The indicated second specific embodiment of Jackson remains silent

Art Unit: 1746

about including a halogenated hydrocarbon into the cleaning process. However, describing a different embodiment, Jackson teaches a mixture of gases for producing densified/supercritical fluids, wherein the mixture includes carbon dioxide and a halogenated hydrocarbon (col.3, lines 35-48). Since Jackson teaches removal of photoresist, since the use of halogenated hydrocarbons within densified/supercritical fluids to enhance removal of photoresist is conventionally known in the art (see, for example the reference to Tipton), one skilled in the art motivated by Tipton would have found obvious to utilize halogenated hydrocarbon in addition to carbon dioxide while forming densified/supercritical conditions in order to enhance removal of photoresist in the second specific embodiment of Jackson. With regard to claim 44, as an example of halogenated hydrocarbon, Tipton teaches the use of chlorocarbon (col. 4, lines 25-31) within the densified fluid in order to enhance removal of photoresist and therefore it also would be obvious to use the chlorocarbon within the teaching of Jackson.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is

Art Unit: 1746

filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1746

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read "M. Kornakov", with a long, sweeping horizontal stroke extending to the right.

Michael Kornakov  
Primary Examiner  
Art Unit 1746

07/18/2007